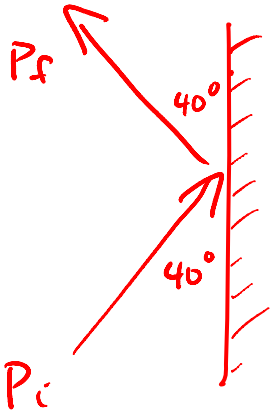
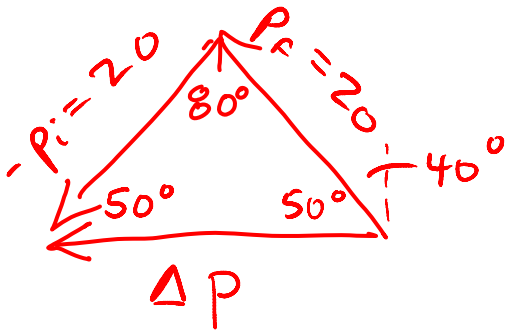
Example #13: A 2.0 kg ball going 10 m/s bounces off a wall at an angle of 40° to the wall. (Both incoming and outgoing angles are 40°). After the bounce the speed is still 10 m/s.

a) **What is the impulse on the ball?**
b) **What is the change in velocity?**



$$\Delta P = P_f - P_i$$
$$= P_f + -P_i$$



$$P_f = P_i = 2(10)$$
$$= 20$$

$$\frac{\sin 80}{\Delta P} = \frac{\sin 50}{20}$$

$$\boxed{\Delta P = 26 \ \frac{kg \cdot m}{s}}$$